

CAPABILITY SHEET

TRAILING SUCTION HOPPER DREDGER (TSHD)

A SEA-GOING SELF-PROPELLED FREE FLOATING VESSEL THAT LOADS DREDGED MATERIAL INTO ITS HOPPER WELL

INTRODUCTION

A Trailing Suction Hopper Dredger (TSHD) is a sea-going self-propelled free floating vessel that loads dredged material into its hopper well. The TSHD's dredging process consists of a cycle of a loading (dredging), transporting (sailing) and discharging. Dredging takes place through the suction pipe(s) and draghead(s) which are located at the lower end(s) of one or two suction pipe(s), installed alongside the vessel. Dredging pump(s) lift the mixture of soil and water into the hopper well. After dredging, the TSHD stops pumping, lifts the suction pipe and draghead on deck and sails to the discharge area. Discharging the dredged material can be done in different ways, such as discharging through bottom doors, or by pumping options such as rainbowing, pumping to a reclamation area, spray pontoon or through the suction pipe.

MAIN PARTS TSHD:

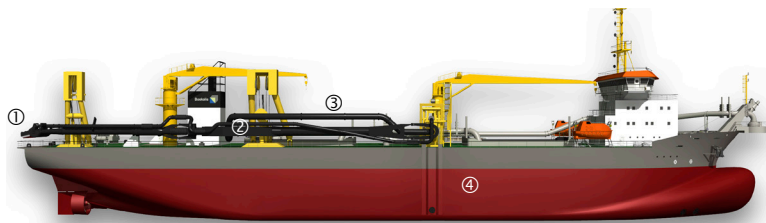
- Standard ship's installation for example engines, the crew' quarters, the bridge with dredging automation and navigation controls, etc.
- The draghead (1), connected at the lower lower end of the suction pipe. This draghead loosens and collects the sediments to be dredged using teeth and/or water jets.

Different types of dragheads can be fitted, depending on the soil conditions;

- The (underwater) dredging pump (2), which pumps the mixture from the seabed into the hopper well and if required from the hopper well to the reclamation area.
- The suction pipe (3) and deck pipelines through which the mixture is transported.
- The hopper well (4) is the ship's hold. The dredged material remains in the hopper well during transport until discharge.

WORK METHOD

To start dredging operations, the TSHD will sail to the dredging (or borrow) area. Once in the dredging area, the suction pipe(s) are lowered to the seabed, the dredge pump(s) are started and dredging commences. While dredging the draghead(s) scrape(s) over the seabed and loosen(s) the sediments. The sediment-water mixture is brought up through the suction pipe and pumped into the hopper well. During loading with its draghead(s) on the



C 1. Draghead 2. Underwater pump 3. Suction pipe 4. Hopper well



A



B



D

A TSHD 'Oranje' pumping dredged material to shore

B Dredging automation

C TSHD 'Willem van Oranje'

D TSHD 'Prins der Nederlanden' rainbowing

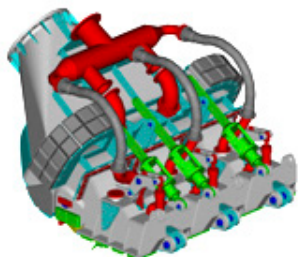
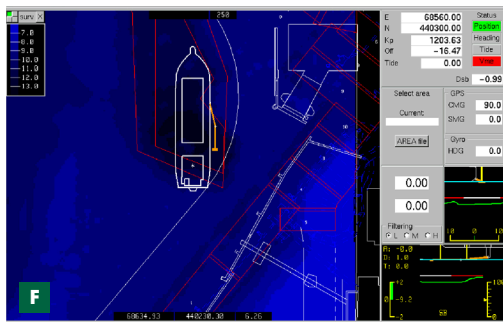
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seabed, the TSHD sails fairly slow. The dredged material settles out in the hopper well and the excess transport water is evacuated through the overflow system. When the maximum load is reached, dredging will be suspended and the suction pipe(s) will be hoisted on deck (E). The vessel then sails loaded with dredged material, to the discharge area. Discharging the dredged material can be done by:

- Opening the bottom doors.
- Pumping through a nozzle over the bow, so-called rainbowing.
- Pumping through pipelines to a reclamation area.
- Pumping through pipelines to a spray pontoon
- Pumping through the suction pipe, so called backfilling.
- Loading barges. This scheme is repeated until an entire section has been dredged to the required dimensions, confirmed by a survey.



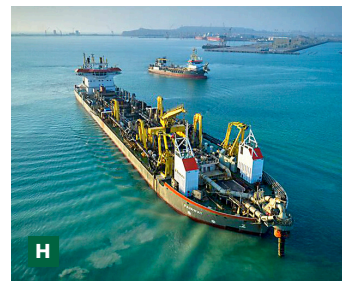
TRAILING SUCTION HOPPER DREDGERS

Some of Boskalis' TSHD's

Name	Capacity (m ³)	Max. dredging depth (m)
Fairway/Queen of the Netherlands	35,500	83 (>100)
Oranje/Prins der Nederlanden	21,000	90
Gateway/Willem van Oranje	12,000	62
Medway/Beachway	7,350	30
Crestway/Shoreway	5,600	33
Waterway/Coastway	4,900	28
Shoalway/Causeway/Strandway/Freeway	4,500	30

SUITABILITY

TSHD is capable to dredge a wide range of material like silt, clay, sand and gravel. Even strong cohesive and cemented soils can be dredged. Different types of dragheads can be fitted depending on soil conditions. Depths of more than 100 m can be achieved by the larger dredgers, using a suction pipe mounted underwater pump. With its maneuverability a TSHD is very suitable in harbors and fairways with busy traffic. A TSHD is often used for harbour deepening and maintenance works, reclamation projects, trenching works and beach nourishments.



DREDGING CONTROL

Dredging tolerances are an accumulation of positioning and tracking accuracy, soil characteristics, swell, tidal data, variances, skilled operation and accuracy of data. Our TSHD's are equipped with state of the arts positioning and survey equipment.

FLEET OF BOSKALIS

Boskalis has around twenty of these vessels, including two of the largest in the world, the 'Queen of the Netherlands' and the 'Fairway'. Some of the TSHDs of Boskalis are listed below. For the complete list of TSHDs of Boskalis check on www.boskalis.com.

DISCHARGE METHODS

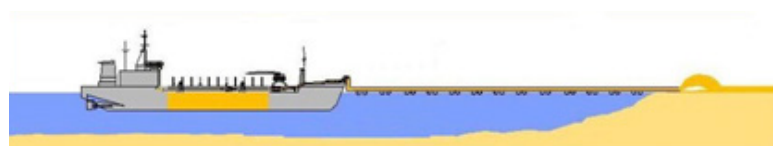
Discharging the dredged material can be done by:



Dumping



Rainbowing



Pumping ashore

- E** Suction pipe(s) and draghead(s)
- F** Dredging automation
- G** Special type of draghead
- H** TSHD 'Fairway'

Boskalis

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